

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 32.

March, 1930.

No. 375.

CONTRIBUTION FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY—NO. LXXXVII

(Continued from page 11)

III. A REVISION OF SOME NORTH AMERICAN SPECIES OF CALAMAGROSTIS

G. L. STEBBINS, JR.

(Plate 195)

THE genus *Calamagrostis* is well known to students of grasses as one in which the species are exceedingly variable and difficult to define. The North American species, mostly boreal or alpine in distribution, have been studied by a number of the best known American grass specialists, in particular Dr. George Vasey, Dr. F. Lamson Scribner, and Dr. T. H. Kearney. The first attempt at a complete classification of the genus in North America, however, was made by Dr. Kearney in 1898.¹ This monograph did a great deal toward clearing up the confusion of names that had existed before this time, and it is the basis for the treatment of the genus in most of the manuals and local floras now in use.

The subdivision of the genus in Kearney's monograph is in many ways unsatisfactory, since it is based to a considerable extent on characters such as the expansion or contraction of the panicle and the flatness or involuteness of the leaves, characters which obviously vary with the habitat of the plant, and, in herbarium specimens, the manner in which the specimen was prepared. For a more sound

¹ T. H. Kearney—The Genus *Calamagrostis* in North America, Bull. U. S. Dept. Agric. Div. Agrost. xi. (1898).

subdivision of the genus it seems advisable to turn to European works, in which a number of subgenera and sections have been described. The treatment in Ascherson & Graebner's "Synopsis der Mitteleuropäischen Flora" (Vol. II, part 1, pp. 197-223) is probably the most satisfactory, and the description there given of the sections of the division *Quinquinerviae* of the subgenus *Eucalamagrostis*, the only division extensively represented in North America, is therefore quoted in translation:

a. *Quinquenerviae* T o r g e s Thür. BV. N. F. XII f. 1898. 23 [1899]). Glumes lanceolate, acuminate. Lemmas mostly 4-nerved above the insertion of the awn.

1. *Calamágris* (Dumortier Agrostogr. Belg. 126 [1823]. *Homoeotricha* T o r g e s Thür. BV. N. F. XII f. 1898 23 [1899]). Callus-hairs spread equally around the callus, forming a closed ring of hairs, and of equal length all around (the larger and straighter ones scattered throughout). Lemma considerably, mostly $\frac{1}{3}$, shorter than the lower glume, completely, or at least in the upper $\frac{1}{2}$ or $\frac{1}{3}$ translucent-membranaceous. Awn delicate, straight, only in rare exceptions weakly geniculate. Palea considerably shorter than the lemma. Rhachilla not prolonged behind the floret, or the prolongation persisting as a short (rarely longer) hairy (rarely glabrous) little point.

2. *Deyeuxia* ([Clarion in P. B. Essai d'une nouvelle Agrost. 43. t. IX fig. 9, 10 [1812] as a Genus]. Torges Thür. BV. N. F. XII f. 1898 23 [1899] as a Section). Callus-hairs quite or almost completely interrupted below the middle of the lemma (through one group of scanty probably shorter hairs), the longest hairs situated on either side of the lemma and more or less crowded together, appearing tufted. Lemma almost always very slightly shorter ($\frac{1}{6}$ - $\frac{1}{8}$) than the lower glume, toward the tip, the edges, and between the nerves translucent, otherwise chartaceous, herbaceous and more or less firm. Awn setiform, distinctly geniculate and twisted above the base, or straight and only exceptionally and indistinctly geniculate and weakly twisted. Palea little to considerably shorter than the lemma. Rhachilla always prolonged behind the base of the floret, above (in our species) with brush-like hairs.

a. *Orthoátherae* Torges Thür. BV. N. F. XII (1898). 24 (1899). Awn straight, only exceptionally indistinctly geniculate. Palea considerably ($\frac{1}{4}$ - $\frac{1}{3}$) shorter than the lemma.

b. *Ancylátherae* (Torges Thür. BV. N. F. XII [1898]. 24 [1899]). Awn geniculate and twisted. Palea almost as long as the lemma.

These subdivisions seemed to be based on more fundamental characters than those of Kearney, and a revision of § *Calamagris*, and § *Deyeuxia*, Subsect. *Orthoatherae* was undertaken with them as a basis. The *Ancylatherae*, most highly developed in the Condilleran Region and in South America, have been omitted on account of their great complexity and their scant representation in eastern America.

It was soon found, however, that some of the characters mentioned above do not hold for the American species. *Calamagrostis Scribneri*

Beal has the short, unequal callus-hairs of § *Deyeuxia*, although its thin, translucent-membranaceous lemma would place it in § *Calamagris*, and its habit is most nearly like that of *C. canadensis*, our most widely spread representative of that section. The lemma is, moreover, just as much shorter than the glumes in the species of *Deyeuxia* as in *Calamagris*, while the prolongation of the rhachilla is present in all species, and is quite as long in some varieties of *C. canadensis* (Michx.) Nutt. as in the majority of the species of the section *Deyeuxia*. The fundamental character separating the two sections, however, the texture of the lemma, is a constant one which, together with the difference in general habit, separates them quite definitely.

This paper deals with the species of the section *Calamagris* and of the subsection *Orthoatherae* in North America. The species are all highly variable, and intermediate forms between many of them were found. In fact, it would probably be possible in any of the subsections to form a continuous series of forms differing but slightly from each other which would include all of the species of the subsection. Species have, therefore, been recognized wherever a clearly definable entity exists with a definite range, and with only a few intermediates between it and closely related forms. Where species already described have been found to pass imperceptibly into related species, with many intermediates where their ranges overlap, it has seemed advisable to relegate them to varieties, even though, in their typical forms, they are quite distinct from each other. *Calamagrostis Langsdorfi* (Link) Trin. is therefore treated, following Inman (*RHODORA*, xxiv. 143), as a variety of *C. canadensis* (Michx.) Nutt., while *C. Macouniana* Scribn. and *C. micrantha* Kearney have been made varieties of *C. canadensis* and *C. neglecta* (Ehrh.) Gaertn. respectively.

In view of these facts, there is little doubt that closely related species of this genus hybridize with each other, and that this is one cause of the complexity of the genus. Some of the species which have been collected only once or twice may be hybrids between more distantly related species, while a few forms obviously intermediate in their characters will be discussed as such.

The following treatment is the result of the examination of the specimens in the Gray Herbarium, the herbarium of the New England Botanical Club (cited as N. E.) and of the types and the more critical specimens in the United States National Herbarium (cited as U. S.), the herbarium of the New York Botanical Garden, and the National Herbarium of Canada.